8. Practicality of Physics ThroughIntegrated Science Student Worksheets

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Practicality of Physics ThroughIntegrated Science Student Worksheets

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Abstract

Cooperative learning type STAD belongs to a method that could be implemented in science studies worksheet especially in Physics. This research is aimed at finding out the respond of experts, practitioners, and students toward science studies worksheet in Physics in high schools. This research is termed as Research and Development. There are nine subjects (three material experts, three people of media experts and three practitioners) involved in assessing the appropriateness of the materials, design, and usability of the students worksheet. Seventy students (20 students are tested in small groups and 50 students are assessed in large groups) are involved to find out the effectively of the integrated science studies worksheets. Validation sheets are intended to find out the respond of the experts and the practitioners. Mean while, students' respond is collected through a questionnaire. The data is analyzed through descriptive statistic using Statistics Package For Social Science software (SPSS version 22.0). The findings show that the respond of the material experts is high (70%) and respond of the practitioners is also high (79%) as well as the respond of the media experts is very high (80%). Moreover, the students' respond is very high (85.30% for small groups and 87.86% for large groups). These findings indicate that the integrated science worksheet is this research is meaningful and effective.

Key Words: Practicality, student worksheet, integrated science.

1. Introduction

Education refers to guided process in changing behavior and attitude of a person or a particular groups purposefully conducted. It is also aimed at building characters of human beings as well as independent personality. Education is the main setting of cooperative learning[1]. In this case it is recognized that the goal of education is to facilitate students to maximize their own particular potentials [2]. Thus, teachers are viewed as the most prominent figures responsible in teaching and learning process [3]. In teaching and learning activities, it is expected that teachers are able to differentiate their learning process whether it is passive teaching and learning process or the active and interactive one[4], teachers are also either expected to facilitate the students to build and obtain their own knowledge. Further, Panina (2008) states that students must learn ad re-produce knowledge transferred to them by the teachers or other learning resources. Another research proves that teachers need to motivate and stimulate students' interest[5]. Students' involvement in learning process is able to improve their achievement and create enjoyable learning environment[6]. It is emphasized that students have to be actively involved in learning process[7].

Students' worksheet is defined as printed teaching materials prepared and used to help students to gain knowledge, skills, and shared social values by giving useful and encourageous comments in the worksheet that students can actively and efficiently participate in the class[8,9,10,11]. The prior statement is supported by

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[1] Johnson, D. W., & Johnson, R. T, Cooperative Learning in 21st Century. *Anales De Psicología* **2014,***30* (3), 841-851.

[2] Isiaka Amosa Gambari, M. O. Y., David Akpa Thomas, Effects of Computer-Assisted STAD, LTM and ICI Cooperative Learning Strategies on Nigerian Secondary School Students' Achievement, Gender and Motivation in Physics. *Journal of Education and Practice* **2015,***6* (9).

[3] Koc, E. S., An Evaluation of the Effectiveness of Committees of Teachers According to the Teachers' Views, Ankara Province Sample. *International Conference on New Horizons in Education* **2014**.

[4] Kutbiddinova, R. A., *Methods of active social-psychological training: study guide*. Yuzhno-Sakhalinsk: SakhSU, 2014.

[5] Serafin, C., The Re-conceptualization of Cooperative Learning in an Inquiryoriented Teaching. *Procedia - Social and Behavioral Sciences* **2016,***217* (2016), 201 – 207.

[6] Karacop, A., Effects of Student Teams-Achievement Divisions Cooperative Learning with Models on Students' Understanding of Electrochemical Cells. *International Education Studies* **2016,***9* (11).

[7] Isiaka Amosa Gambari, M. O. Y., David Akpa Thomas, Effects of Computer-Assisted STAD, LTM and ICI Cooperative Learning Strategies on Nigerian Secondary School Students' Achievement, Gender and Motivation in Physics. *Akpa Malaysian Online Journal of Educational Sciences* **2015,***3* , 11-26.

[8] (a) Kaymakci, S., A Review of Studies on Worksheets in Turkey. *Online Submission, US-China Education Review A 1* **2012**, 57-64; (b) Lee, C. D., Worksheet usage, reading achievement, classes' lack of readiness and science achievement: A cross-country comparison. *International Journal of Education in Mathematics, Science and Technology* **2014,***2* (2), 96-106;(c) Sasmaz-Oren, F. O., U. , An application about pre-service teachers' development and use of worksheets and an evaluation of their opinions about the application. *Educational Sciences: Theory and Practice* **2012,***12* (1), 263-270;(d) Tan, E., İlkogretim 7. sınıf dil bilgisi ogretiminde zarflar konusuyla ilgili yapılandırmacı yaklasıma gore hazırlanmış ca-lısma y apraklarının ogrenci başarısına etkisi. *Yayımlanmamıs yuksek lisans tezi, Ataturk Universitesi, Sosyal Bilimler Enstiti- tusu, Erzurum* **2008**.

[9] Martin, M. O., Mullis, I. V. S., Foy, P, &Stanco, G. M, TIMSS2011 international results in science.*Chestnut Hill, M.A: TIMSS & PIRLS International Study Center* **2012**.

Kosa (2008) that the students' worksheet is regarded as an important printed visual media created pursuant to constructivism approach. Besides, the worksheet becomes the crucial component of the curriculum in some countries[11]. According to[12], that method that enables active and mutual interaction between students and teachers are required. The method can be cooperative learning, group discussion, debate, games, simulation, business, case study, projects, social-psychological training, moderation and computerized simulation.

In this study, the developed students' worksheet is created based on STAD of cooperative learning method as itenable students to be individually active in the classroom[13]. In a research conducted by[14], it is found that learning content can be mastered by the students through STAD of cooperative learning method. Besides in STAD, teachers are able to transferred the content in a smallgroup work through the following steps, namely introduction, developing activities and guided practice[15]. Cooperative learning helps the students to be more cooperative in an effective group working[16,17,18]. Besides, it refers to a teaching strategy in which the students have to work together in a small group and help each other to gain targeted academic content[19,20,21]. In the implementation of

[10]Rimma A. Kutbiddinova, A. A. E., Marina A. Romanova, The Use of Interactive Methods in the Educational Process of the Higher Education Institution. *International Journal Of Environmental & Science Education* **2016,***11* (14), 6557-6572.

[11] (a) Amornsinlaphachai, P. a. D., K, Developing the Model of Web-Based Learning Environment Enhancing Problem-Solving for Higher Education Students. *American Journal of Scientific Research* **2012,***52*, 21-32; (b) Anowar Hossain, R. A. T., Effects of cooperative learning on students' achievement and attitudes in secondary mathematics. *Procedia - Social and Behavioral Sciences* **2013,***93* (2013), 473 – 477;(c) Kasíková, H., *Kooperativníučení a vyučování.Teoretické a prakticképroblémy*.UniverzitaKarlova v Praze :Karolinum, 2007;(d) Macarena Navarro-Pablo, E. J. G.-S., Teaching to training teachers through cooperative learning. *Procedia - Social and Behavioral Sciences* **2015,***180* (2015), 401 – 406.

[12] (a) Slavin, R., K, *Cooperative Learning*. Baltimore, MD, AS: Universitas Johns Hopkins, 2010; (b) Zahara Aziz, M. A. H., A comparison of cooperative learning and conventional teaching on students' achievement in secondary mathematics. *Procedia Social and Behavioral Sciences* **2010,***9* (2010), 53-62;(c) Siegel, C., Implementing a research based model of cooperative learning. The Journal of Educational Research.*98* **2005,***6* (339-349);(d) Teemuangsai, M. T. S., Student Team Achievement Divisions (STAD) Technique through the Moodle to Enhance Learning Achievement.*International Education Studies* **2013,***6*.

[13] (a) Arends, R. L., *Learning to Teach*. Pustaka Pelajar: Yogyakarta, 2008; (b) Budiarjo, M., Nuri Soeseno, Rosa Evaquarta, dan Panji Anugrah, *Pengantar Ilmu Politik*. Jakarta: Universitas Terbuka, 2005;(c) Sanjaya, W., *Strategi Pembelajaran*. Kencana: Jakarta, 2008.

[14] IsiakaAmosaGambari,*Op.Cit*

[15] IsiakaAmosaGambari, M. O. Y., David Akpa Thomas, Op. Cit

[16] Elif Akdemir, A. A., From Past to Present: Trend Analysis of Cooperative Learning Studies. *Procedia - Social and Behavioral Sciences* **2012,***55* (2012), 212 – 217.

16. (a) Jegede, S. A., Student's anxiety towards the learning of Chemistry in some Nigerian secondary schools. *Educational Research and Review* **2007,***2* (7), 193-197;(b) Yusuf, M. O. A., A. O, Effects of Computer Assisted Instruction (CAI) on Secondary School Students' Performance in Biology. *The Turkish Online Journal of Educational Technology* **2010,***9* (1).

[17] Gupta, M. P., P, Effect of cooperative learning on high school students' mathematical achievement and retention using TAI and STAD methods. *Indian Journal of Psychology and Education* **2012,***2* (1), 75-86.

[18]Amornsinlaphachai, P., The design of a framework for cooperative learning through web utilizing data mining technique to group learners. *Procedia - Social and Behavioral Sciences* **2015,***174* (2015), 27 – 33.

[19]Serafin, Op. Cit

this method, students are actively involved in communicating their ideas, share their thought, giving feedback, problem solving and assess their own learning objectives and outcomes[22,23,24]. Moreover, cooperative learning enable students to develop their oral and social skills[25]. It is found out that the interest of cooperative learning is getting bigger in the forthcoming years [26].

There are some issues detected in teaching and learning process in Science class. Some students are lack of capabilities to independently understand the concept and content of Physics, some teachers implement inappropriate method and lack of ability in problem solving[27, 28]. Teachers still used some didactic traditional method in which memorizing factual information in the main activity that students' contribution in class discussion is low[29]. Mostly teachers are acted as active givers while students are becoming passive recipient during the learning process in the classroom[30]. Consequently, the learning process is colored with boredom, anxiety, and less students' curiosity and imagination[31].It is identified that teacher-centered learning process and inappropriate teaching method becomes the main cause of students bad performance in science class[32]. Thus, cooperative learning method is used to overcome the issues, however based on some studies teachers are lack of capability to implement the method that they have problem in grouping the students. One of the main constraints in the method is that it is quite difficult to find out the blueprint of cooperative learning and common group working[33].

The issue is believed can be overcome by using students' worksheet and STAD cooperative learning method as some conducted studies reveal that students taught by using STAD of cooperative learning method and computer gain better

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[20]Amosa Isiaka Gambari, M. O. Y., Effectiveness of Computer-Assisted Stad Cooperative Learning Strategy on Physics Problem Solving, Achievement and Retention.*Malaysian Online Journal of Educational Technology* **2015,***3* (3).
[21] Slavin, R. E., *Cooperative Learning: What Makes Group-work Work? In H. Dumont, D. Istance & F. Benavides (Eds.), The Nature of Learning: Using Research to Inspire Practice*. London: OECD Publishing, 2010.
[22]Isiaka Amosa Gambari, M. O. Y., David Akpa Thomas, Op. Cit
[23]Slavin, R. E., *Instruction Based on Cooperative Learning. In R. E. Mayer, & P. A. Alexander (Eds.), Handbook of Research on Learning and Instruction*. Taylor & Francis: New York, 2011.
[24] (a) Sugiyono, *Metode Penelitian Kuantitatif, Kualitatif dan R & D*. Alfabeta: Bandung, 2009; (b) Sugiyono, *Penelitian Pendidikan*. Alfabeta: Bandung, 2012;(c) Sugiyono, *Metode Penelitian Kuantitatif dan Kualitatif dan R & D*. Alfabeta: Bandung, 2013.
[25]Slavin, R. E, Op. Cit
[26] Khasan, D., Hobri, Pengembangan Perangkat Pembelajaran Matematika Berbasis Whole Brain Teaching dengan Pendekatan Quantum Learning pada Sub Pokok Bahasan Segitiga untuk SMP Kelas VII **2015**.
[27] Arikunto S., *Dasar-dasar Evaluasi Pendidikan*. Bumi Aksara: Jakarta, 2009.
[28]Podolak Ken, J. D., Interactive Modern Physics Worksheets Methodology and Assessment.*European J of Physics Education* **2013,***4* (2).
[29] Isiaka Amosa Gambari, M. O. Y., David Akpa Thomas, Op. Cit
[30]Tutak, Op. Cit
[31] Burhan, Op. Cit
[32]Isiaka Amosa Gambari, M. O. Y., David Akpa Thomas, Op. Cit
[33]Amornsinlaphachai, P, Op. Cit

performance in their Physics class than those taught with other methods[34]. The involvement of the students in learning process can be obtained through integrated activities and the students worksheet[35,36]. The use of students' worksheet help students to simplify and find the solution for the problems they are facing [37]. During their group work, the objectives of the group and individual accountability is prominent to improve students' learning outcome[38]. Besides, the cooperative learning is a student-centered method[39].

2. Research Tools

This study belongs to Research and Development (R & D). The rationale is that the method is appropriate with the purposes of the research namely to develop a product and to find out the practicality response of the product[40]. The total numbers of the subjectsis 79 people, consisted of 3 people material experts, 3 people media experts, 3 practitioners and 70 students (20 students for smallgroups and 50 students for biggroup) involved to determine thequality of the worksheets. Data was collected through validating sheets for experts while students' respond was obtained through questionnaire. The data then is analyzed by *software Statistics Package For Social Science* (SPSS version 22.0).

3. Findings

The students worksheet is developed based on the School-based curriculum (standard of competence, basic competence and syllabus). The Worksheet is printed on A4 paper-size, 1,5 space, *font* 12 pt; fonts used are *Times New Roman*, *Bauhaus 93, Monotype Corsiva*, *BlackoakStd*, *Comic Sans MS, Vijaya*, and the verse of Qur'an is written through Add-Ins program. The design consists of front cover and back cover, acknowledgement, page of writer team, conceptual map, procedures of the worksheet and table of content. The worksheet consist of Content Standard, pre-activities, basic quiz, summary, sample of problems, group activities, individual quiz, scoring rubric, and references. Besides there is quotation of Quran verses related to the materials in the worksheets, Muslim scholars and proverbs to motivate student in learning process.

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[34] Mei-Yao Huanga, H.-Y. T., Wen-Yi Wangc, Jui-Fu Chend, Ya-Ting Yua,Chien-Chih Chouc, Effects of cooperative learning and concept mappingintervention on critical thinking and basketball skills inelementary school. *Thinking Skills and Creativity* **2017,***23* (2017), 207–216.

[35] Alanazy, S. M., Saudi students' attitudes, beliefs, and preferences toward coeducational online cooperative learning.*Wayne State University .187 pages; AAT 3445199* **2011**.

[36] Ozgecan Tastan Kirika, S. M., The self-efficacy of pre-service elementary teachers using cooperative learning in science teaching. *Procedia - Social and Behavioral Sciences* **2012,***46*, 5005 – 5009.

[37] Jacobs, G., Cooperative Learning and Second Language Teaching. *Cambridge University Press* **2006**.

[38] Rianawati, Implementation Strategy Cooperative Learning Type of Student Achievement Division Team (STAD) to Improve Social Skills Students on Learning Morals in Man 2 Pontianak Learning the Year 2016/2017.*Journal of Education and Practice* **2017,***8* (3).

[39] Martinez Rodriguez R. del C, B. C. L., Villanueva Ibanez M, Cooperative learning in the implementation of teaching chemistry (didactic instrumentation) in engineering in Mexico. *Procedia - Social and Behavioral Sciences* **2015,***174* (2015), 2920 – 2925.

[40] Johnson, D.W., & Johnson; IsiakaAmosaGambari, M.O.Y., David Akpa Thomas, Op. Cit

Respond classification of experts, practitioners and students are devided into four categories, namely: (i) very high and high that small revisión needed yet the validation re-test is not any more required; (ii) average, a quite massive revisión is needed yet the validation re-test is not at all suggested; (iii) low and very low, both revisión and validation re-test is highly reccommended[41]. Further, in Arikunto[42], it is stated that criteria of respond assessment toward the students worksheet is categorized as 81% - 100 % (highly applicable); 61% - 80% (applicable); 41% - 60% (sufficiently applicable); 21% - 40% (less applicable); < 21 % (not at all applicable). The respond of theexperts and the practitioners is described in the following table 1:

Table 1: Respond of the Experts (material, media) and Practitioners

No	Respond	Percentage	Index
1	Material Experts	70%	High
2	Media Experts	80%	Veyhigh
3	Praktisi	79%	High

Table 1 clearly shows that the respond from the material experts is high (70%). The respond of the practitioners are also high (79%), and very high respond (80%) is obtained from the media experts. The finding implies that small revisión for the worksheet is required yet the validation re-test is not anymore reccommended[43]. The three validation can be implemented and distributed to the students[44]. Mean while, the students' respond can be observed in the following table 2:

Table 2: Students' Respond

No	Students' respond	Percentage	Ket.
1	Small group experiment	85%	Veryhigh
2	Big group experiment	88%	Veryhigh

Table 2 shows that students respond of small group experimentis 85%, and big group experimentis 88%. Thus, only small revisión is required for the students' work sheet and re-experimented application is not necessarily conducted. The students' worksheet can be used as a teaching material in class of Physics[45].

The developed students' worksheet is suitable and valid yet with small revision that it can be used as a learning instruction and material. Moreover, the finding reveals that the students worksheet belongs to proper criteria one that the it can be further published after a small revision. Further, students are interested and they address positive comments and feedback toward the worksheet. This will

[41]Khasan, D., Hobri, *PengembanganPerangkatPembelajaranMatematikaBerbasis Whole Brain Teaching dengan Pendekatan Quantum Learning pada Sub PokokBahasanSegitigauntuk SMP Kelas VII*. 2015.
[42] Arikunto, S., *Dasar-dasar Evaluasi Pendidikan*. 2009, Jakarta: Bumi Aksara.
[43]Khasan, D., Hobri, Op. Cit
[44]Arikunto, S, Op. Cit
[45]Ibid

make further interaction between students and teacher posible to occur[46]. Similarly, the positive feedback regarding to the worksheet is also obtained from the material experts and practitioners, namely "high and "very high" that they suggest small revision for the students' worksheets should be conducted before they are re-distributed to the students. The study regarding to the attractiveness of the worksheet is also checked that it is stated that the content and the layout of the worksheet are interesting. It is believed that learning process can be effectively and actively conducted.

Pursuant to the students' respond previously quoted, students worksheet which is based on cooperative technique possess interesting writing sytle, appropriate figures, and attractive colors. Further the evaluation system in the worksheet is clear and easy to be understood by the students. Standardized language style, layout of the figures and funny symbols and expressions stimulate students' learning interest and motivation. The finding is also supported by research conducted by Burhan [47] that students worksheet supported and enriched by interesting figures (cartoon) gain more students' interest. Several researches also focus on the design of the students' worksheet[48].

According to Krombab[49], the students' worksheet is effective to help 11-15 years old students. Accordingly, the selection of cooperative learning method of STAD in this study related to the age of high school students (12-15) is appropriate as the method stimulate students to develop their motoric skills and help them to be a creativethinker[50]. Cooperative learning method is found based on learning theory of behaviourism and cognitivism [51]. Thus, based on social constructivism learning theory, learning process occur when the students are actively involved in learning activities and working together with other students to achieve their shared goals[52].

Cooperative learning is an prominent method in science class in Turkey [53]. The ultimate reason is that the method is emphasized on how individuals respect others in their group or other groups as the success of learning is based on individual respect and learning outcomes[54]. Further, the statement is supported

[46] Johnson, D.W., & Johnson, Op. Cit
[47] Burhan, Y., *Developing worksheets enriched by concept cartoons concerning the acid-base concepts*. 2008, Karadeniz Technical University Graduate School of Natural and Applied Sciences.
[48] Irina A. Kutbiddinova, A. A. E., Marina A. Romanova, Op. cit
[49] Krombab, A.H., U, *Acquiring knowledge about biodiversity in a museum –are worksheet effective?* . Journal of Biological Education, 2008. **42**(4): p. 157–163.
[50] Mei-Yao Huanga, H.-Y.T., Wen-Yi Wangc, Jui-Fu Chend, Ya-Ting Yua,Chien-Chih Chouc, *Effects of cooperative learning and concept mappingintervention on critical thinking and basketball skills inelementary school*. Thinking Skills and Creativity, 2017. **23**(2017): p. 207–216.
[51] Alanazy, S.M., *Saudi students' attitudes, beliefs, and preferences toward coeducational online cooperative learning*. Wayne State University .187 pages; AAT 3445199, 2011.
[52] Ibid
[53] Ozgecan Tastan Kirika, S.M., *The self-efficacy of pre-service elementary teachers using cooperative learning in science teaching*. Procedia - Social and Behavioral Sciences, 2012. **46**: p. 5005 – 5009.
[54] Jacobs, G., *Cooperative Learning and Second Language Teaching*. Cambridge University Press, 2006

by the findings of a research conducted by[55], that the idea of the cooperative learning method of STAD enables students to improve their social skills is appropriate. based on the study it is revealed that students intolerant behavior can be minimized because of cooperative learning as they are positively independent for each other[56]. The findings of the research is regarded appropriately support the statement of this study.

In addition, many researches reveal that the implementation of cooperative learning of STAD teaching technique succeed in various science projects like in chemistry [57]dan Physics [58]. It is found that the STAD method is more effective than individual learning, discussion method or conventional class instruction. The finding is also supported by [59, 60] states that cooperative learning method is more effective that traditional teaching method. According to other findings [61]students taught by cooperative learning method is showing better learning outcomes than those taught through individual instruction and traditional teaching method. Gillies (2008) states that the cooperative learning method promotes better learning process and outcomes. Those findings are in line with the result of this research that students respond toward the worksheet and STAD method of cooperative learning is very high in Physics.

Research by [62], states that students taught by cooperative learning method posess better skills than those taught by traditional approach. Some steps in implementing cooperative method of STAD in experiment class[63], has been modified related to procedures of quiz, assessing, correcting students' work, creating groups and students recognizing. Meanwhile, there are some procedures stated in the students worksheet in this research, namely: (i) giving motivation and appreciation, (ii) building team work, (iii) teacher presentation, (iv) heterogeneous learning activities in team, (v) individual quizz, (vi) and rewarding.

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[55] Rianawati, *Implementation Strategy Cooperative Learning Type of Student Achievement Division Team (STAD) to Improve Social Skills Students on Learning Morals in Man 2 Pontianak Learning the Year 2016/2017*. Journal of Education and Practice, 2017. **8**(3).

[56] Martinez Rodriguez R. del C, B.C.L., Villanueva Ibanez M, *Cooperative learning in the implementation of teaching chemistry (didactic instrumentation) in engineering in Mexico*.Procedia - Social and Behavioral Sciences, 2015.**174**(2015): p. 2920 – 2925.

[57] Adesoji, F.A., & Ibraheem, T. L, *Effects of student teams-achievement divisions strategy and mathematics knowledge on learning outcomes in chemical kinetics*. The Journal of International Social Research, 2009. **2**.

[58] Ho, F.F.B., H. K *Cooperative Learning: Exploring its Effectiveness in the Physics Classroom*. Asia-Pacific Forum on Science Learning and Teaching, 2007. **8**(2).

[59] Kaul, P., *The effect of learning together techniques of co-operative learning method on students achievement in mathematics*. Edutracks, 2010. **9**(12).

[60]Keramati, M., *Effect of co-operative learning (learning together technique) on academic achievement of physics course*. Proceedings of World Conference on ELearning in Corporate, Government, Healthcare, and Higher Education 2009: p. 2751-2756.

[61] Podolak Ken, J. D, Op. Cit

[62]IsiakaAmosaGambari, M. O. Y., David Akpa Thomas, Op. Cit

[63]Karacop, Op. Cit

4. Conclusion

Students worksheets are believed to make the learning process impressive and interesting for the students. This research gives positive contribution for teachers in developing the worksheet as teaching materials. However, it is suggested that the teachers have to pay high attention on issues faced by the students during their learning process that appropriate teaching materials can help students to boost their learning outcomes.

References

[1] Johnson, D.W., & Johnson, R. T, Cooperative Learning in 21st Century.Anales De Psicología, 2014. **30**(3): p. 841-851.

[2] Isiaka Amosa Gambari, M.O.Y., David Akpa Thomas, Effects of Computer-Assisted STAD, LTM and ICI Cooperative Learning Strategies on Nigerian Secondary School Students' Achievement, Gender and Motivation in Physics. Journal of Education and Practice, 2015. **6**(9).

[3] Koc, E.S., An Evaluation of the Effectiveness of Committees of Teachers According to the Teachers' Views, Ankara Province Sample. International Conference on New Horizons in Education, 2014.

[4] Kutbiddinova, R.A., Methods of active social-psychological training: study guide. 2014, Yuzhno-Sakhalinsk: SakhSU.

[5] Serafin, C., The Re-conceptualization of Cooperative Learning in an Inquiryoriented Teaching. Procedia - Social and Behavioral Sciences, 2016. **217**(2016): p. 201 – 207.

[6] Karacop, A., Effects of Student Teams-Achievement Divisions Cooperative Learning with Models on Students' Understanding of Electrochemical Cells. International Education Studies, 2016. **9**(11).

[7] Isiaka Amosa Gambari, M.O.Y., David Akpa Thomas, Effects of Computer-Assisted STAD, LTM and ICI Cooperative Learning Strategies on Nigerian Secondary School Students' Achievement, Gender and Motivation in Physics. Akpa Malaysian Online Journal of Educational Sciences, 2015. **3**: p. 11-26.

[8] Kaymakci, S., A Review of Studies on Worksheets in Turkey. Online Submission, US-China Education Review A 1 2012: p. 57-64.

[9] Lee, C.D., Worksheet usage, reading achievement, classes' lack of readiness and science achievement: A cross-country comparison. International Journal of Education in Mathematics, Science and Technology, 2014. **2**(2): p. 96-106.

[10] Sasmaz-Oren, F.O., U. , An application about pre-service teachers' development and use of worksheets and an evaluation of their opinions about the application. Educational Sciences: Theory and Practice, 2012. **12**(1): p. 263-270.

[11] Tan, E., İlkogretim 7. sınıf dil bilgisi ogretiminde zarflar konusuyla ilgili yapılandırmacı yaklasıma gore hazırlanmış ca-lısma y apraklarının ogrenci başarısına etkisi. Yayımlanmamıs yuksek lisans tezi, Ataturk Universitesi, Sosyal Bilimler Ensti- tusu, Erzurum, 2008.

[12] Martin, M.O., Mullis, I. V. S., Foy, P, & Stanco, G. M, TIMSS2011 international results in science. Chestnut Hill, M.A: TIMSS & PIRLS International Study Center, 2012.

[13] Rimma A. Kutbiddinova, A.A.E., Marina A. Romanova, The Use of Interactive Methods in the Educational Process of the Higher Education Institution. International Journal Of Environmental & Science Education, 2016. **11**(14): p. 6557-6572.

[14] Yunisrina Qismullah Yusuf, Y.N., Lutfia Hanum, A Teacher's Experience in Teaching with Student Teams-Achievement Division (STAD) Technique. International Journal of Instruction, 2015. **8**(2).

[15] Amornsinlaphachai, P.a.D., K, Developing the Model of Web-Based Learning Environment Enhancing Problem-Solving for Higher Education Students. American Journal of Scientific Research, 2012. **52**: p. 21-32.

[16] Anowar Hossain, R.A.T., Effects of cooperative learning on students' achievement and attitudes in secondary mathematics. Procedia - Social and Behavioral Sciences, 2013. **93**(2013): p. 473 – 477.

[17] Kasíková, H., Kooperativní učení a vyučování. Teoretické a praktické problémy. 2007, Univerzita Karlova v Praze : Karolinum.

[18] Macarena Navarro-Pablo, E.J.G.-S., Teaching to training teachers through cooperative learning. Procedia - Social and Behavioral Sciences, 2015. **180**(2015): p. 401 – 406.

[19] Slavin, R., K, Cooperative Learning. 2010, Universitas Johns Hopkins: Baltimore, MD, AS.

[20] Zahara Aziz, M.A.H., A comparison of cooperative learning and conventional teaching on students' achievement in secondary mathematics. Procedia Social and Behavioral Sciences, 2010. **9**(2010): p. 53-62.

[21] Siegel, C., Implementing a research based model of cooperative learning. The Journal of Educational Research. 98, 2005. **6**(339-349).

[22] Teemuangsai, M.T.S., Student Team Achievement Divisions (STAD) Technique through the Moodle to Enhance Learning Achievement. International Education Studies, 2013. **6**.

[23] Arends, R.L., Learning to Teach. 2008, Yogyakarta: Pustaka Pelajar.

[24] Budiarjo, M., Nuri Soeseno, Rosa Evaquarta, dan Panji Anugrah, Pengantar Ilmu Politik. 2005, Jakarta: Universitas Terbuka.

[25] Sanjaya, W., Strategi Pembelajaran. 2008, Jakarta: Kencana.

[26] Elif Akdemir, A.A., From Past to Present: Trend Analysis of Cooperative Learning Studies. Procedia - Social and Behavioral Sciences, 2012. **55**(2012): p. 212 – 217.

[27] Jegede, S.A., Student's anxiety towards the learning of Chemistry in some Nigerian secondary schools. Educational Research and Review, 2007. **2**(7): p. 193-197.

[28] Yusuf, M.O.A., A. O, Effects of Computer Assisted Instruction (CAI) on Secondary School Students' Performance in Biology. The Turkish Online Journal of Educational Technology, 2010. **9**(1).

[29] Gupta, M.P., P, Effect of cooperative learning on high school students' mathematical achievement and retention using TAI and STAD methods. Indian Journal of Psychology and Education, 2012. **2**(1): p. 75-86.

[30] Amornsinlaphachai, P., The design of a framework for cooperative learning through web utilizing data mining technique to group learners. Procedia - Social and Behavioral Sciences, 2015. **174**(2015): p. 27 – 33.

[31] Amosa Isiaka Gambari, M.O.Y., Effectiveness of Computer-Assisted Stad Cooperative Learning Strategy on Physics Problem Solving, Achievement and Retention. Malaysian Online Journal of Educational Technology, 2015. **3**(3).

[32] Tutak, T.v.B., O, Dinamik geometri yazılımı ile geometri ogretiminin ogrencilerin van heile geometri anlama du-zeylerine etkisi. 8th International Educational Technology Con- ference, Eskisehir, 2008(1058-1061).

[33] Tutak, T.v.B., O, Geometri ogretiminde bilgisa-yar destekli ogretimin ogrenci basarısına etkisi. 8th International Educational Technology Conference (s. 1062-1065), Eskisehir, 2008.

[34] Bozdogan, A., Fen bilgisi ogretiminde calısma yaprak-ları ile ogretimin ogrencilerin fen bilgisi tutumuna ve mantıksal dusunme becerilerine etkisi. Yayimlanmamis yuksek lisans tezi, Cukurova Universitesi, Sosyal Bilimler Enstitusu, Adana, 2007.

[35] Slavin, R.E., Cooperative Learning: What Makes Group-work Work? In H. Dumont, D. Istance & F. Benavides (Eds.), The Nature of Learning: Using Research to Inspire Practice. 2010, London: OECD Publishing.

[36] Slavin, R.E., Instruction Based on Cooperative Learning. In R. E. Mayer, & P. A. Alexander (Eds.), Handbook of Research on Learning and Instruction. 2011, New York: Taylor & Francis.

[37] Borg, W.R.G., M.G, Educational Research : An Introduction (5th ed.). 1983, New York: Longman.

[38] Borg, W.R.G., M.G, Educational Research: An Introduction. 7 ed. 2003, USA, Pearson Education.

[39] Sugiyono, Metode Penelitian Kuantitatif, Kualitatif dan R & D. 2009, Bandung: Alfabeta.

[40] Sugiyono, Penelitian Pendidikan. 2012, Bandung: Alfabeta.

[41] Sugiyono, Metode Penelitian Kuantitatif dan Kualitatif dan R & D. 2013, Bandung: Alfabeta.

[42] Khasan, D., Hobri, Pengembangan Perangkat Pembelajaran Matematika Berbasis Whole Brain Teaching dengan Pendekatan Quantum Learning pada Sub Pokok Bahasan Segitiga untuk SMP Kelas VII. 2015.

[43] Arikunto, S., Dasar-dasar Evaluasi Pendidikan. 2009, Jakarta: Bumi Aksara.

[44] Podolak Ken, J.D., Interactive Modern Physics Worksheets Methodology and Assessment. European J of Physics Education, 2013. **4**(2 2013).

[45] Burhan, Y., Developing worksheets enriched by concept cartoons concerning the acid-base concepts. 2008, Karadeniz Technical University Graduate School of Natural and Applied Sciences.

[46] Krombab, A.H., U, Acquiring knowledge about biodiversity in a museum –are worksheet effective? . Journal of Biological Education, 2008. **42**(4): p. 157–163.

[47] Mei-Yao Huanga, H.-Y.T., Wen-Yi Wangc, Jui-Fu Chend, Ya-Ting Yua,Chien-Chih Chouc, Effects of cooperative learning and concept mappingintervention on critical thinking and basketball

skills inelementary school. Thinking Skills and Creativity, 2017. **23**(2017): p. 207–216.

[48] Alanazy, S.M., Saudi students' attitudes, beliefs, and preferences toward coeducational online cooperative learning. Wayne State University .187 pages; AAT 3445199, 2011.

[49] Ozgecan Tastan Kirika, S.M., The self-efficacy of pre-service elementary teachers using cooperative learning in science teaching. Procedia - Social and Behavioral Sciences, 2012. **46**: p. 5005 – 5009.

[50] Jacobs, G., Cooperative Learning and Second Language Teaching. Cambridge University Press, 2006.

[51] Rianawati, Implementation Strategy Cooperative Learning Type of Student Achievement Division Team (STAD) to Improve Social Skills Students on Learning Morals in Man 2 Pontianak Learning the Year 2016/2017. Journal of Education and Practice, 2017. **8**(3).

[52] Martinez Rodriguez R. del C, B.C.L., Villanueva Ibanez M, Cooperative learning in the implementation of teaching chemistry (didactic instrumentation) in engineering in Mexico. Procedia - Social and Behavioral Sciences, 2015. **174**(2015): p. 2920 – 2925.

[53] Adesoji, F.A., & Ibraheem, T. L, Effects of student teams-achievement divisions strategy and mathematics knowledge on learning outcomes in chemical kinetics. The Journal of International Social Research, 2009. **2**.

[54] Ho, F.F.B., H. K Cooperative Learning: Exploring its Effectiveness in the Physics Classroom. Asia-Pacific Forum on Science Learning and Teaching, 2007. **8**(2).

[55] Kaul, P., The effect of learning together techniques of co-operative learning method on students achievement in mathematics. Edutracks, 2010. **9**(12).

[56] Keramati, M., Effect of co-operative learning (learning together technique) on academic achievement of physics course. Proceedings of World Conference on ELearning in Corporate, Government, Healthcare, and Higher Education 2009: p. 2751-2756.

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